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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MOORE, KARLA A

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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/742,386	Applicant(s) KIMURA ET AL.	
	Examiner KARLA MOORE	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 118-123 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 118-123 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 118-120 and 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,077,412 to Ting et al.

4. Ting et al. disclose a metal forming unit (10) for plating a surface of a substrate with a metal in Figures 1-16, substantially as claimed and comprising: a substrate holding portion (13) configured to hold the substrate with the surface, to be plated, facing up and to rotate the substrate (column 6, rows 6-8), the substrate holding portion capable of moving vertically between an upper plating position and a lower cleaning

Art Unit: 1792

position (column 6, rows 43-47); an anode 14) located in a position above the substrate when held by said substrate holding portion; a cathode portion (12) having a cathode electrode (15) and a seal member (42) located above the substrate when held by said substrate holding portion and configured to rotate together with said substrate holding portion (column 11, rows 55 through column 12, row), the surface of the substrate being in contact with said cathode electrode and said seal member when said substrate holding portion is in the plating position; a plating liquid supply member (36) configured to supply a plating liquid onto the surface of the substrate when held by said substrate holding portion in the plating position; and a nozzle (18-20) configured to supply pure water or a chemical liquid to at least one of said cathode portion and the surface of the substrate when held by said substrate holding portion in the cleaning position.

5. However, while Ting et al. disclose numerous configurations and possibilities for rotating the cathode electrode and/or the substrate holding portion, Ting et al. do not explicitly disclose a step of rotating the two together in the lower cleaning position. Ting et al. do however teach: 1) rotation of the substrate holding portion while in a lower cleaning position where processed with a cleaning fluid (e.g. water) (column 6, rows 45-49, for example), 2) that the cathode portion is also cleaned during a cleaning step when the substrate holding portion is in the lower cleaning position (column 8, rows 1-10), and 3) that rotation of parts in general is an accepted practice for ensuring uniform distribution of a fluid (column 6, rows 11-14).

6. Based on aforementioned teachings of Ting et al. (at least) it would have been obvious to one of ordinary skill in the art exercising ordinary creativity, common sense

Art Unit: 1792

and logic to configure the substrate holding portion in the cleaning position and said cathode portion to rotate together with each other at the time of the Applicants invention in order to ensure uniform distribution of the cleaning fluid to the cathode portion.

7. With respect to claim 119, Ting et al. further disclose a plating liquid recovery nozzle (100) configured to recover the plating liquid from the surface of the substrate when held by said substrate holding portion in the plating position.

8. With respect to claim 120, Ting et al. further disclose a precoating and recovery arm having a nozzle (100) configured to supply a precoating liquid onto the surface of the substrate when held by said substrate holding portion in the plating position.

9. With respect to claim 122, Ting et al. further disclose a plating liquid tray (11) for storing the plating liquid therein; and an electrode arm portion (16) configured to move said anode between said plating liquid tray and the position above the substrate when held by said substrate holding portion.

10. **Claim 121 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ting et al. as applied to claims 118-120 and 122 above, and further in view of U.S. Patent No. 6,176,922 to Talieh.**

11. Ting et al. discloses the metal film forming unit substantially as claimed.

12. However, Ting et al. fail to disclose a plating liquid impregnated material provided on a lower surface of said anode (i.e. the surface of the anode proximate the substrate).

13. Talieh teach the use of a plating liquid impregnated material provided on a surface of an anode proximate to a substrate to be plated for the purpose of preventing

Art Unit: 1792

molecules of metals from becoming permanently deposited on surfaces of the substrate when such a deposit is undesired (column 5, rows 3-15).

14. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a plating liquid impregnated material provided on a surface of the anode proximate to the substrate to be plated (i.e. the lower surface) in order to prevent molecules of metals from becoming permanently deposited on surfaces of the substrate when such a deposit is undesired as taught by Talieh.

15. **Claim 123 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,267,853 to Dordi et al. (1) in view of U.S. Patent No. 6,231,428 to Maloney et al. and U.S. Patent No. 6,077,412 to Ting et al.**

16. Dordi et al. (1) disclose a semiconductor substrate processing apparatus in Figure 3, substantially as claimed and comprising: a carry-in and carry-out section (210; column 5, rows 20) for carrying in and carrying out a semiconductor substrate having a surface on which a circuit is formed, the apparatus is capable of carrying in and out in a dry state by using spin/rinse/dry station (212; column 5, row 24); a plated metal/electroplating film forming unit (240; column 5, rows 41-46) for forming a plated metal film on said semiconductor substrate which has been carried in; and a transport mechanism (216) for transporting said semiconductor substrate between units. The processing apparatus of Dordi et al. (1) may further comprise an annealing unit (211; column 5, row 20) for annealing said semiconductor substrate.

Art Unit: 1792

17. Dordi et al. (1) disclose the invention substantially as claimed and as described above.

18. However, Dordi et al. (1) fail to explicitly teach the use of separate handling mechanisms for substrates in wet and dry states.

19. Maloney et al. teach the use of separate handling mechanisms for wafers in wet and dry states for the purpose of using a separate mechanism for dry (clean) wafers (column 19, rows 11-30). This avoids contamination.

20. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided separate mechanism for wet and dry wafers in Dordi et al. (1) in order to avoid contamination by transferring dry (clean) substrates and wet substrates separately as taught by Maloney et al.

21. Dordi et al. (1) and Maloney et al. disclose the invention substantially as claimed and as described above. Dordi et al. (1) further disclose that treatment in said plated film forming unit is performed with said semiconductor held by a (i) substrate holding portion (Figure 6, 450; column 5, rows 45-47).

22. However, Dordi et al. (1) and Maloney et al. fail to teach other particulars of the metal film forming unit.

23. Ting et al. disclose a metal forming unit (10) for plating a surface of a substrate with a metal in Figures 1-16, in detail and substantially as claimed, comprising: a substrate holding portion (13) configured to hold the substrate with the surface, to be plated, facing up and to rotate the substrate (column 6, rows 6-8), the substrate holding portion capable of moving vertically between an upper plating position and a lower

Art Unit: 1792

cleaning position (column 6, rows 43-47); an anode 14) located in a position above the substrate when held by said substrate holding portion; a cathode portion (12) having a cathode electrode (15) and a seal member (42) located above the substrate when held by said substrate holding portion and configured to rotate together with said substrate holding portion (column 11, rows 55 through column 12, row), the surface of the substrate being in contact with said cathode electrode and said seal member when said substrate holding portion is in the plating position; a plating liquid supply member (36) configured to supply a plating liquid onto the surface of the substrate when held by said substrate holding portion in the plating position; and a nozzle (18-20) configured to supply pure water or a chemical liquid to at least one of said cathode portion and the surface of the substrate when held by said substrate holding portion in the cleaning position.

24. However, while Ting et al. disclose numerous configurations and possibilities for rotating the cathode electrode and/or the substrate holding portion, Ting et al. do not explicitly disclose a step of rotating the two together in the lower cleaning position. Ting et al. do however teach: 1) rotation of the substrate holding portion while in a lower cleaning position where processed with a cleaning fluid (e.g. water) (column 6, rows 45-49, for example), 2) that the cathode portion is also cleaned during a cleaning step when the substrate holding portion is in the lower cleaning position (column 8, rows 1-10), and 3) that rotation of parts in general is an accepted practice for ensuring uniform distribution of a fluid (column 6, rows 11-14).

Art Unit: 1792

25. Based on aforementioned teachings of Ting et al. (at least) it would have been obvious to one of ordinary skill in the art exercising ordinary creativity, common sense and logic to configure the substrate holding portion in the cleaning position and said cathode portion to rotate together with each other at the time of the Applicants invention in order to ensure uniform distribution of the cleaning fluid to the cathode portion.

26. The metal forming unit of Ting et al. is provided for the purpose of economic implementation of the mass production of semiconductor wafers (column 2, rows 20-31).

27. Further, it would have been obvious to provide the metal forming unit of Ting et al. in Dordi et al. (1) and Maloney et al. in order to implement a novel processing tool capable of economic mass production of semiconductor products as taught by Ting et al.

Response to Arguments

28. Applicant's arguments with respect to the previously pending claims have been considered but are moot in view of the new ground(s) of rejection. The arguments are drawn to newly added subject matter in newly added claims. New art (Ting et al.) has been relied upon, which addresses the deficiencies of the previously relied upon art with respect to the newly added claims/subject matter.

Conclusion

29. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARLA MOORE whose telephone number is (571)272-1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1792

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. M./

Primary Examiner, Art Unit 1792